

## CLAIMS

What is claimed is:

- 1           1.     A field effect transistor, comprising:  
2                 a)     a channel;  
3                 b)     an undercut area under the channel;  
4                 c)     a gate electrode disposed over the channel; and  
5                 d)     a compressive film in the undercut area, wherein the compressive thin film  
6                         creates longitudinal stress in an area of the channel under the gate  
7                         electrode.
- 1           2.     The transistor of claim 1 wherein the transistor is a PFET, and an upper portion of  
2                 the channel is under longitudinal compressive stress.
- 1           3.     The transistor of claim 1 wherein the transistor is a NFET, and an upper portion of  
2                 the channel is under longitudinal tensile stress.
- 1           4.     The transistor of claim 1, wherein the transistor is a PFET, and the undercut area  
2                 is disposed under an end of the channel.
- 1           5.     The transistor of claim 1, wherein the transistor is a NFET, and the undercut area  
2                 is disposed under a middle portion of the channel.
- 1           6.     The transistor of claim 1 wherein the transistor is a PFET, and the transistor  
2                 comprises an undercut area under a source, and an undercut area under a drain.
- 1           7.     The transistor of claim 1 wherein the compressive film is made of a material  
2                 selected from the group consisting of oxidized polysilicon, oxidized amorphous  
3                 silicon, silicon nitride, oxidized SiGe, and thermal silicon dioxide.

- 1           8.     A method for making a field effect transistor with a current channel with  
2                 longitudinal stress, comprising the steps of:  
3                 a)     forming an undercut area under the channel; and  
4                 b)     forming a compressive film in the undercut area so that longitudinal stress  
5                         is created in the channel.
- 1           9.     The method of claim 8 wherein the undercut area is located at an end of the  
2                 channel.
- 1           10.    The method of claim 8 wherein the undercut area is located under a middle  
2                 portion of the channel.
- 1           11.    The method of claim 10 wherein the channel is released in the middle portion.
- 1           12.    The method of claim 8 wherein the undercut area is created by etching a buried  
2                 oxide layer from under the channel.
- 1           13.    The method of claim 8 wherein the compressive film is formed by depositing  
2                 polysilicon and then oxidizing the polysilicon.
- 1           14.    A field effect transistor, comprising:  
2                 a)     a buried oxide layer;  
3                 b)     a channel disposed on the buried oxide layer;  
4                 c)     an undercut area under the channel;  
5                 d)     a gate electrode disposed over the channel; and  
6                 e)     a compressive film in the undercut area, wherein the compressive thin film  
7                         creates longitudinal stress in an area of the channel under the gate  
8                         electrode.

1            15.    The transistor of claim 14 wherein the undercut area is an area of etched buried  
2                   oxide material.